ELECTRONIC TUBE REFERENCE

19EZ8

Voltage - Triple Triode electronic tube

CONSOLIDATED TECHNICAL DATA
3 SECTIONS
CONSTRUCTION
TRIODE-TRIODE-TRIODE

High-mu triple triode for compact multi-stage voltage-amplifier circuits.

General characteristics

BASE DESIGNATION	–	**BASE PINS**	9
NOMINAL HEATER	18.9 V / 150 mA	**PARALLEL HEATER**	– / –
HEATING	Indirect	**SERIES OPERATION**	Not specified
CATHODE ARRANGEMENT	Separate cathodes	**SECTION CONSTRUCTION**	Similar

Section ratings

SECTION1 Triode

PLATE RESISTANCE	13600 Ω
TRANSCONDUCTANCE	0.0042 S
AMPLIFICATION FACTOR	57
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	2 W

Representative row for identical repeated sections.

SECTION2 Triode	
PLATE RESISTANCE	13600 Ω
TRANSCONDUCTANCE	0.0042 S
AMPLIFICATION FACTOR	57
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	2 W
Physical section restored under current one-row-per-physical-section policy.	

SECTION3 Triode	
PLATE RESISTANCE	13600 Ω
TRANSCONDUCTANCE	0.0042 S
AMPLIFICATION FACTOR	57
MAXIMUM PLATE VOLTAGE	330 V
MAXIMUM PLATE DISSIPATION	2 W
Physical section restored under current one-row-per-physical-section policy.	

19EZ8 — High-Mu Triple Triode Vacuum Tube

A miniature, nine-pin triple-triode receiving tube designed for VHF amplification, oscillator-mixer, automatic frequency control (AFC) service in FM receivers, and color television applications.

Overview

The **19EZ8** is a high-mu triple triode containing three independent triode sections within a single compact envelope. It is designed for high-frequency applications, particularly as a VHF amplifier, oscillator, mixer, or automatic frequency control (AFC) valve in FM and color television receivers.

The tube is electrically identical to the **6EZ8** except for its heater ratings. By integrating three high-mu triodes into a single T-6 1/2 miniature envelope, the 19EZ8 allows designers to minimize chassis space and component count in complex RF and IF stages.

Construction and Physical Characteristics

The 19EZ8 is constructed in a miniature glass envelope (T-6 1/2 bulb outline) with a small button 9-pin base (designated as 9KA or E9-1). The tube can be mounted and operated in any position.

Cathode and Heater Arrangement

The tube features coated unipotential cathodes. To fit three triodes and a heater into a 9-pin base, the cathodes of Section 1 and Section 2 are internally tied to one side of the heater. This common connection is brought out to a single pin. The cathode of Section 3 is electrically isolated from the other sections and is brought out to its own dedicated base pin, allowing independent biasing for this section.

Physical Dimensions

- **Maximum Diameter:** 0.875 inches
- **Maximum Seated Height:** 1.937 inches
- **Maximum Overall Height:** 2.187 inches
- **Socket Requirement:** Standard miniature 9-contact socket

Heater Ratings and Heater-Cathode Limits

The heater is designed for series or parallel operation in television and radio receivers.

Parameter	Value
Heater Voltage (AC or DC)	18.9 V ± 10%
Heater Current	0.15 A (150 mA)

Heater-Cathode Voltage Ratings (Section 3)

Because Section 3 has an independent cathode, it is subject to specific heater-to-cathode voltage limits:

- **Heater Positive with Respect to Cathode:** 100 V (maximum DC or peak)
- **Heater Negative with Respect to Cathode:** 100 V to 200 V (maximum total DC and peak, depending on the rating system applied)

Pinout Configurations and Discrepancies

The 19EZ8 is registered with a **9KA** basing diagram. However, different technical specifications document significantly different pinout configurations for this tube. Designers must exercise extreme caution and verify the specific manufacturer's pinout before wiring a circuit.

The four documented pinout configurations are detailed below:

Configuration A

In this layout, Section 1 and Section 2 occupy the first few pins, and Section 3 occupies the higher-numbered pins.

- **Pin 1:** Plate, Section 1 (1P)
- **Pin 2:** Grid, Section 2 (2G)

- **Pin 3:** Plate, Section 2 (2P)
- **Pin 4:** Heater (H)
- **Pin 5:** Cathode Sections 1 & 2 / Heater (1,2K / H)
- **Pin 6:** Grid, Section 1 (1G)
- **Pin 7:** Cathode, Section 3 (3K)
- **Pin 8:** Grid, Section 3 (3G)
- **Pin 9:** Plate, Section 3 (3P)

Configuration B

This layout alters the connections of Section 3 and the grid of Section 1 compared to Configuration A.

- **Pin 1:** Plate, Section 1 (1P)
- **Pin 2:** Grid, Section 2 (2G)
- **Pin 3:** Plate, Section 2 (2P)
- **Pin 4:** Heater / Cathode Sections 1 & 2 (H, 1K/2K)
- **Pin 5:** Heater (H)
- **Pin 6:** Plate, Section 3 (3P)
- **Pin 7:** Grid, Section 3 (3G)
- **Pin 8:** Cathode, Section 3 (3K)
- **Pin 9:** Grid, Section 1 (1G)

Configuration C

In this configuration, Section 3 is mapped to the lower-numbered pins, and Sections 1 and 2 are mapped to the higher-numbered pins.

- **Pin 1:** Plate, Section 3 (3P)
- **Pin 2:** Grid, Section 3 (3G)
- **Pin 3:** Cathode, Section 3 (3K)
- **Pin 4:** Heater / Cathode Sections 1 & 2 (H, 1K/2K)
- **Pin 5:** Heater (H)
- **Pin 6:** Plate, Section 2 (2P)
- **Pin 7:** Grid, Section 2 (2G)
- **Pin 8:** Plate, Section 1 (1P)
- **Pin 9:** Grid, Section 1 (1G)

Configuration D

This configuration is similar to Configuration C but swaps the plate and cathode connections of Section 3.

- **Pin 1:** Cathode, Section 3 (3K)
- **Pin 2:** Grid, Section 3 (3G)
- **Pin 3:** Plate, Section 3 (3P)

- **Pin 4:** Heater / Cathode Sections 1 & 2 (H, 1K/2K)
- **Pin 5:** Heater (H)
- **Pin 6:** Plate, Section 2 (2P)
- **Pin 7:** Grid, Section 2 (2G)
- **Pin 8:** Plate, Section 1 (1P)
- **Pin 9:** Grid, Section 1 (1G)

Electrical Characteristics and Typical Operating Points

Under typical Class A1 amplifier operating conditions, each of the three triode sections exhibits identical characteristics. The high amplification factor of 57 makes each section highly effective for voltage gain and oscillator service.

Parameter (Each Section)	Typical Value
Plate Voltage	125 V
Grid Voltage	-1.0 V
Plate Current	4.2 mA
Transconductance	4,200 µmhos
Amplification Factor (µ)	57
Plate Resistance (Approx.)	13,600 Ω
Grid Voltage for Cutoff ($I_b = 20\ \mu\text{A}$)	-4 V

The relationship between the parameters is consistent with standard triode formulas: $\mu \approx g_m \times r_p$ Using the typical values: $0.0042\ \text{S} \times 13,600\ \Omega = 57.12$ This closely matches the published amplification factor of 57.

Maximum Ratings

The maximum ratings of the 19EZ8 are defined under the Design-Maximum Rating System. These limits apply to each individual section unless otherwise specified.

- **Maximum Plate Voltage:** 300 V to 330 V (depending on the specific rating system applied)
- **Maximum Positive DC Grid Voltage:** 0 V
- **Maximum Negative DC Grid Voltage:** 50 V
- **Maximum Plate Dissipation (Each Plate):** 2.0 W
- **Maximum Total Plate Dissipation (All Plates Combined):** 5.0 W

The total plate dissipation limit of 5.0 W is an important design constraint: if all three sections are operated simultaneously, they cannot all be run at their individual maximum plate dissipation of 2.0 W (which would total 6.0 W).

Direct Interelectrode Capacitances

The high-frequency performance of the 19EZ8 is heavily influenced by its interelectrode capacitances. The table below compares the capacitances of each section both with and without an external shield (using standard shield #315 connected to the cathode of the section under test).

Capacitance Parameter	With Shield	Without Shield
Grid to Plate (Each Section)	1.5 pF	1.5 pF
Input (Each Section)	2.6 pF	2.4 pF
Output (Section 1)	1.4 pF	0.21 pF
Output (Section 2)	1.2 pF	0.40 pF
Output (Section 3)	1.2 pF	0.36 pF
Heater to Cathode (Section 3)	0.15 pF	0.17 pF

The extremely low unshielded output capacitances (ranging from 0.21 pF to 0.40 pF) are beneficial for minimizing loading in high-frequency RF mixer and oscillator circuits.

Technical Summary

The **19EZ8** is a versatile **miniature high-mu triple triode** housed in a T-6 1/2 glass envelope with a 9-pin button base. Operating with a **18.9 V, 0.15 A** heater, it is designed for space-saving applications in FM and television receivers, serving as a VHF amplifier, oscillator, mixer, or AFC valve.

Each of its three sections provides an amplification factor of **57**, a transconductance of **4,200 µmhos**, and a plate resistance of **13,600 Ω** under typical Class A1 conditions. While Sections 1 and 2 share a common cathode connection tied to the heater, Section 3 features an independent cathode with dedicated biasing capabilities. Due to significant variations in published pinout configurations for the 9KA base, circuit designers must carefully verify the physical connections of their specific components.

SOURCE OPERATING CONDITIONS

1961 Tung Sol

SOURCE PDF

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1961 TUNG SOL

Section 1 · Triode

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Plate Voltage	**125 V**	EachSection

CHARACTERISTIC		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Plate Current	**4.2 mA**	EachSection

SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

1966 Tung Sol Electronic Tubes 3 of 4

SOURCE PDF

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Triode

CHARACTERISTIC		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Grid-to-plate capacitance each section	**1.5 pF**	WholeTube
Input capacitance each section	**2.6 pF**	WholeTube
Output capacitance section 1	**1.4 pF**	WholeTube
Output capacitance section 2	**1.2 pF**	WholeTube
Output capacitance section 3	**1.2 pF**	WholeTube

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Maximum plate voltage	**330 V**	WholeTube
Maximum plate dissipation each plate	**2 W**	WholeTube
Maximum total plate dissipation all plates	**5 W**	WholeTube
Maximum negative DC grid voltage	**50 V**	WholeTube
Plate voltage	**125 V**	TypicalOperation
Grid voltage	**-1 V**	TypicalOperation
Plate resistance	**13600 ohm**	TypicalOperation
Transconductance	**4200 µS**	TypicalOperation
Amplification factor	**57**	TypicalOperation
Plate current	**4.2 mA**	TypicalOperation

SOURCE OPERATING CONDITIONS

1968 General Electric Co

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1968 GENERAL ELECTRIC CO

Section 1 · Triode

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
Heater Voltage Tolerance	**10 %**	Nominal 18.9 V

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